setting a length of a train of alpha pulses of a gradient echo sequence specific to the user-related imaging parameters; and

applying the gradient echo sequence to selectively acquire data ~~acquisition~~ from the targeted tissue.

2. (Currently Amended) The method of claim 1 wherein the step of ~~determining~~ setting the length of a train of alpha pulses is carried out on-the-fly.

3. (Currently Amended) The method of claim 1 wherein the step of ~~determining~~ setting the length of a train of alpha pulses includes the step of determining an optimal number of RF pulses to be carried out after a spectrally selective inversion pulse.

4. (Original) The method of claim 3 wherein the spectrally selective inversion pulse is constructed to have a flip angle sufficient to drive longitudinal magnetization of the suppressed tissue into a steady state condition prior to application of a subsequent alpha pulse.

5. (Original) The method of claim 4 further comprising the step of applying another spectrally selective inversion pulse at TR, wherein the another spectrally selective inversion pulse has a flip angle of 180°.

6. (Original) The method of claim 3 wherein the step of applying includes applying the series of tissue suppression pulses immediately after the spectrally selective RF pulse.

7. (Original) The method of claim 1 further comprising the step of placing, at a center of k-space, data corresponding to a gradient echo substantially corresponding to a null point of the suppressed tissue.

8. (Original) An MRI apparatus to acquire gradient echo data comprising:

a magnetic resonance imaging (MRI) system having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field and an

RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images; and

a computer programmed to:

(A) determine a null point of tissue to be suppressed;

(B) determine a time interval for longitudinal magnetization of the tissue to recover to the null point; and

(C) from the time interval, determine a number of alpha pulses to be applied after each inversion pulse of a gradient echo pulse sequence.

9. (Original) The MRI apparatus of claim 8 wherein the computer is further programmed to place at a center of k-space an echo substantially corresponding to the null point of the suppressed tissue.

10. (Original) The MRI apparatus of claim 8 wherein a first inversion pulse has a flip angle less than 180° and subsequent inversion pulses have a flip angle of 180°.

11. (Original) The MRI apparatus of claim 10 wherein the computer is further programmed to:

determine an arccosine of a ratio between steady-state magnetization and thermal equilibrium magnetization; and

set the flip angle of the first inversion pulse to the arccosine.

12. (Original) The MRI apparatus of claim 8 wherein the computer is further programmed to apply one of a 2D gradient echo acquisition and a 3D gradient echo acquisition.

13. (Original) The MRI apparatus of claim 8 wherein the computer is further programmed to carry out acts (A) – (C) on-the-fly.

14. (Original) The MRI apparatus of claim 13 wherein the computer is further programmed to identify a set of user inputs identifying receiver bandwidth, x-resolution, TR, T_1 of the tissue, flip angle, y-resolution, and number of slices.

15. (Original) A pulse sequence for gradient echo acquisition, the pulse sequence comprising:

a first TR period and at least a second TR period;

a first inversion pulse having a flip angle less than 180° played out during the first TR period;

a second inversion pulse having a flip angle of 180° played out during each subsequent TR period; and

a number of RF alpha pulses played out during each TR period wherein a portion of the alpha pulses is played out prior to zeroing of longitudinal magnetization of a tissue targeted for evaluation.

16. (Original) The pulse sequence of claim 15 wherein the flip angle of the first inversion pulse is set to a value sufficient to immediately drive suppressed transverse magnetization of the tissue to steady-state.

17. (Original) A computer readable storage medium having a computer program to implement a gradient echo acquisition and representing a set of instructions that when executed by a computer causes the computer to:

identify a set of user-selected imaging parameters for an imminent MR scan of a targeted tissue;

on-the-fly, determine a flip angle of a spectrally selective inversion pulse to be applied to immediately drive suppressed magnetization of the targeted tissue to steady-state; and

on-the-fly, determine a number of alpha pulses to be applied after the spectrally selective inversion pulse such that alpha pulses are applied before and after longitudinal magnetization of the targeted tissue reaches zero.

18. (Original) The computer readable storage medium of claim 17 wherein the set of instructions further causes the computer to reset the flip angle of the spectrally selective inversion pulse to 180° after expiration of a first TR period.

19. (Original) The computer readable storage medium of claim 17 wherein the set of instructions further causes the computer to fill k-space such that an echo substantially corresponding to a null point of the targeted tissue fills a center of k-space.

20. (Original) The computer readable storage medium of claim 17, wherein the set of instructions further causes the computer to place, at a center of k-space, data corresponding to a gradient echo substantially corresponding to a null point of the suppressed tissue.